DL40-1A

SYSTRON DONNER

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* Major Regional Service Center

NOTICE

This Instruction Manual provides general characteristics, operating procedures, theory of operation, maintenance and calibration procedures and includes a complete schematic, troubleshooting guide and parts list pages for the model(s) listed on the front cover.

Any questions concerning this documentation should be directed to the Publications Dept., Trygon Electronics Inc., 1200 Shames Drive, Westbury, N.Y., 11590.

Questions concerning the operation and application of Trygon power supplies should be directed to the Applications Engineering Dept., at the above address.

MEASUREMENT OF REGULATION AND RIPPLE

The specifications cited herein for regulation and ripple can be readily attained on every Trygon power supply, provided the proper method of measurement is employed. The major consideration is that the highly stable meter and oscilloscope, specified in the calibration section test procedures, must be connected to the sensing terminals and not the load terminals. The reason for this precaution is that the voltage drop between the load terminals and sensing terminals will yield an inaccurate regulation ripple measurement.

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SECTION 1

DESCRIPTION

1.1 INTRODUCTION

The DL40-1A power supply is a flexible and dependable source of DC power, which can be used to meet a variety of needs. These needs may range in scope from inspection and production testing, to laboratory bench testing and systems applications.

The wide range of outputs available makes this unit well suited for use as basic laboratory power sources. The ability to provide power packaged in minimum space with high reliability meets the demands of most systems requirements.

The versatility of this unit is enhanced by the enclosure of two identical but independently adjustable power supplies in a common package.

All components used in the construction of this unit is of the highest quality available, and have been subjected to 100% incoming inspection, per acceptable AQL levels.

Each electrolytic filter capacitor is of computer grade, and has been quoted by the manufacturer as having a life expectancy exceeding ten(10) years. All silicon transistors have been "derated" and temperature aged to provide high reliability. All rectifiers are hermetically sealed silicon units, and all zener diodes have been temperature stabilized.

1.2 GENERAL FEATURES

Output, Sensing, and Remote Programming terminals are located on a thirteen-terminal barrier strip mounted on the rear panel of the unit. The AC power switch, AC pilot lamp, 10 turn voltage controls, current limit control and appropriate metering devices are all located on the front panel. For convenience, additional output terminals have been provided on the front panel.

Constant Voltage Mode

A constant voltage is maintained across the output terminals within the rated voltage output, provided that the load does not draw more than the rated output current.

Short Circuit Protection

Short circuit protection is provided by the Automatic Current Limiting circuit which limits the maximum output current under all load conditions. In the event of a short

circuit, the output voltage will return to its previous level only upon removal of the short circuit.

The point at which current limiting occurs is adjustable by the front panel Current Limit Control.

Remote Programming

Remote Programming is provided in the voltage mode of operation, and may be utilized over the entire voltage range of the unit. The scale factor for Remote Voltage Programming is 500 ohms per volt.

1.3 PRECAUTIONARY MEASURES

Wire Size

To assure proper regulation under all load conditions, and to prevent severe distortions of the AC line voltage, it is very important to take into consideration the physical size and current handling capabilities of the input power line. Serious losses in regulation and increase in ripple may result from underrated or overloaded AC input lines. The maximum AC impedance from the breaker box to the power supply input should not exceed 0.75 ohms.

Voltage Regulator and Inverter Inputs

Care should be used when using voltage regulators or inverters as a primary power source. The outputs of these devices are usually not sinusoidal in nature, and if used as the AC source for the power supply, may cause serious loss of regulation of the power supply output. Capacitive input filtering used for semiconductor power supplies requires charging to the peak of the rectified AC wave which non-sinusoidal AC sources may not provide.

Systems Considerations

In systems applications it is recommended that each power supply input power line by run separately to the AC distribution box, in order to minimize cross coupling and interaction between equipment. Do not run sensitive signal leads such as the remote sensing leads in the same cable as the AC input without shielding. To keep the AC ripple in the output to a minimum it is recommended that the AC input cables should not be run in close proximity to the output load cables.

Terminal Post Resistance

All terminals and shorting links serving Outputs, Sensing and Programming must be securely tightened before use. Serious loss of regulation and an increase in ripple can result due to a voltage drop caused by loose terminals and shorting links.

TABLE 2 - 2 SHORTING LINK APPLICATION

Remote vs. Local Sensing

Terminals	Condition	Function
1 & 2 4 & 5	connected connected	local sensing and regulation at rear output terminals. Output B.
8 & 9 11 & 12	connected connected	local sensing and regulation at rear output terminals. Output A.
1 & 2 4 & 5	not connected not connected	Remote sensing and regulation at load. Run individual lead wires between terminals 2 & 4 to load. (AWG #18). Output B.
8 & 9	not connected	Remote sensing and regulation at load. Run individual lead wire between terminals 9 & 11 to load. (AWG # 18). Output A.

Note: Front panel output terminals are always connected internally for local sensing and cannot be used for remote sensing.

Front or Rear Panel Output Selection

DC output terminals for both sections of the power supply are located on the front and rear panels of the unit. Sensing terminals, however, are available only at the rear panel barrier strips.

Shorting Link Application, Rear Panel

The power supply is shipped from the factory with all shorting links in place across terminals. In this configuration, and with the load connected across the rear panel output terminals, local sensing and programming operation from the rear panel is provided. Connections for other rear panel modes of operation are shown in TABLE 2-2 SHORTING LINK APPLICATION.

2.3 CONTROLS

Front Panels

TABLE 2-3 FRONT PANEL CONTROLS

NAME	FUNCTION
AC Power	Toggle switch, controls input power
Meter Function A Meter Function B	Slide switch, selects output meter indication of either voltage or current.
Voltage Adjust A Voltage Adjust B	Potentiometer, adjust voltage output.
Current limit Adjust control	Potentiometer sets current limit point.

Internal

All internal control settings have been factory preset, and require no additional adjusting. However, if it should become necessary to adjust any of the internal controls due to circuit changes caused by component aging or replacement, refer to the calibration section of this instruction manual.

2.4 OPERATION

Connections

Prior to the application of power, connect all loads; external wiring and shorting links required for the mode of operation desired.

Grounding

Either side of the output may be grounded, or the output may be used in a floating condition.

Power On

Connect the line cord to a nominal AC input power source. Set POWER switch S202 to AC-ON and observe that pilot lamp DS101 glows.

Warm-Up

No warm-up time is necessary to place the unit into operation. However, a 30 minute warm-up period is recommended to reach rated stability.

Series Operation

To operate both sections of this power supply in a series configuration, connect the output of each section in series. When operation in this mode, it is necessary to adjust the output of each section independently. The output voltage is equal to the sum of the voltage setting of each section.

Parallel Operation

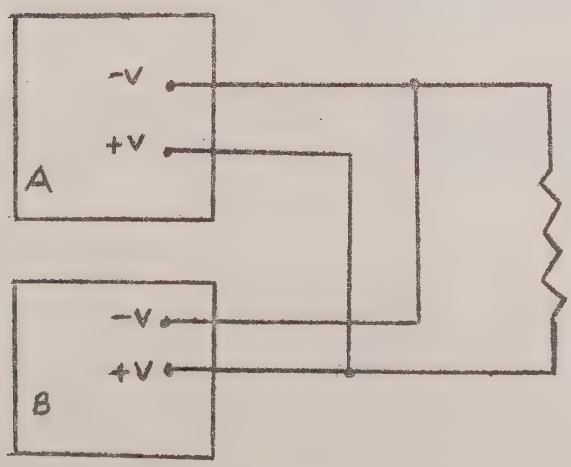
Both sections of the Dual Lab power supply may be placed in parallel to provide a combined current capability twice that of a single section.

A) Before placing the sections in parallel, each section should be set to provide exactly the required voltage.

B) Set the current limit adjustment on each supply to maximum position if maximum current capability is desired.

C) Connect the power supply sections in parallel as shown in Figure 2-1.

WARNING: Two supplies (section) must not be placed in parallel if their voltage outputs are different by more than approximately two volts.



PARALLEL OPERATION
FIGURE 2-1

SECTION 3

THEORY OF OPERATION

3.1 GENERAL

The purpose of the Trygon Dual Lab Series power supply is to provide two fully independent, well regulated and adjustable DC outputs in a single compact and versatile half rack configuration. Both outputsmay be used independently or in series or parallel combination with each other, thereby greatly increasing the output range capabilities of this unit.

The electrical circuitry of both operating sections of the unit is identical. To differentiate between the two operating sections, one section is designated as the "A" supply and the other as the "B" supply. In addition, all reference designations in the "B" section are prefixed by the number one hundred. Except for the use of prefix numbers in the "B" section, the component values for both operating sections are identical. Circuit components which are common have either 100/200 or no prefix at all. In addition, items on heat sink have 200 prefixes.

Therefore, the reference designations referred to in the following circuit descriptions may be applied to either operating section by adding the prefix number to the reference designation when applicable.

The following paragraphs describe the major circuits used in the DL40-1A power supply. As each circuit is described, reference should be made to both the Block Diagram, Figure 3-1 and the Schematic Diagram in the rear of this manual.

Primary Input

Input power is obtained through power transformer T1, full wave rectifier sets CR1 and CR2, CR10 through CR13, and filter capacitors C1 and C6.

When AC power switch S202 is set to AC ON, pilot lamp DS101 illuminates, and AC power is applied to transformer T1. DC output power is immediately available from both operating sections.

Reference Supply

The rectified and filtered voltage from diode rectifiers CR1 and CR2 and filter capacitor C1 is preregulated by reference zener diode CR3. This stabilized DC voltage is supplied to constant current source Q1, whose output is in turn regulated by voltage reference zener diode CR5. The voltages developed across voltage reference zener diodes CR4 and CR5 are highly stable reference voltages established at a higher positive potential than the positive output of the power supply.

Series Regulator

The rectified DC voltage from the input diode rectifiers and input capacitor C6 is directed through series pass transistor Q201. Conduction of this transistor is controlled by circuitry which causes it to act as a variable resistor. Overall resistance of the series pass varies in accordance with the need of the power supply to increase or decrease its output voltage or current.

Conduction of Q201 is directly controlled by driver stages Q202, Q102 and Q9, which in turn are controlled by error amplifier Q5.

Comparator and Error Amplifier

Voltage sensing and comparison is accomplished by differential amplifier Q7. A sample of the output voltage on the base of Q7 is compared to the stable reference voltage at the base of Q6. An unbalance caused by a change in voltage at either negative sensing (-S) barrier strip terminal 9, or across voltage adjustment control R42, will appear as a voltage change at the collector of Q7.

This difference voltage is amplified by error amplifier Q5, and is used to regulate series pass driver Q202 by means of driver stages Q10 and Q9. Error amplifier Q5 has two diode inputs to its base which form an "or" gate for error signals. CR7 presents error signals from differential amplifier Q6, while CR6 presents an error signal in the event of either a short circuit or when the power supply is driven into the current limiting mode of operation.

When operating in the current limiting mode, differential amplifiers Q2 and Q3 become balanced, thereby causing CR6 to conduct and in turn, drive error amplifier Q5 toward cut-off.

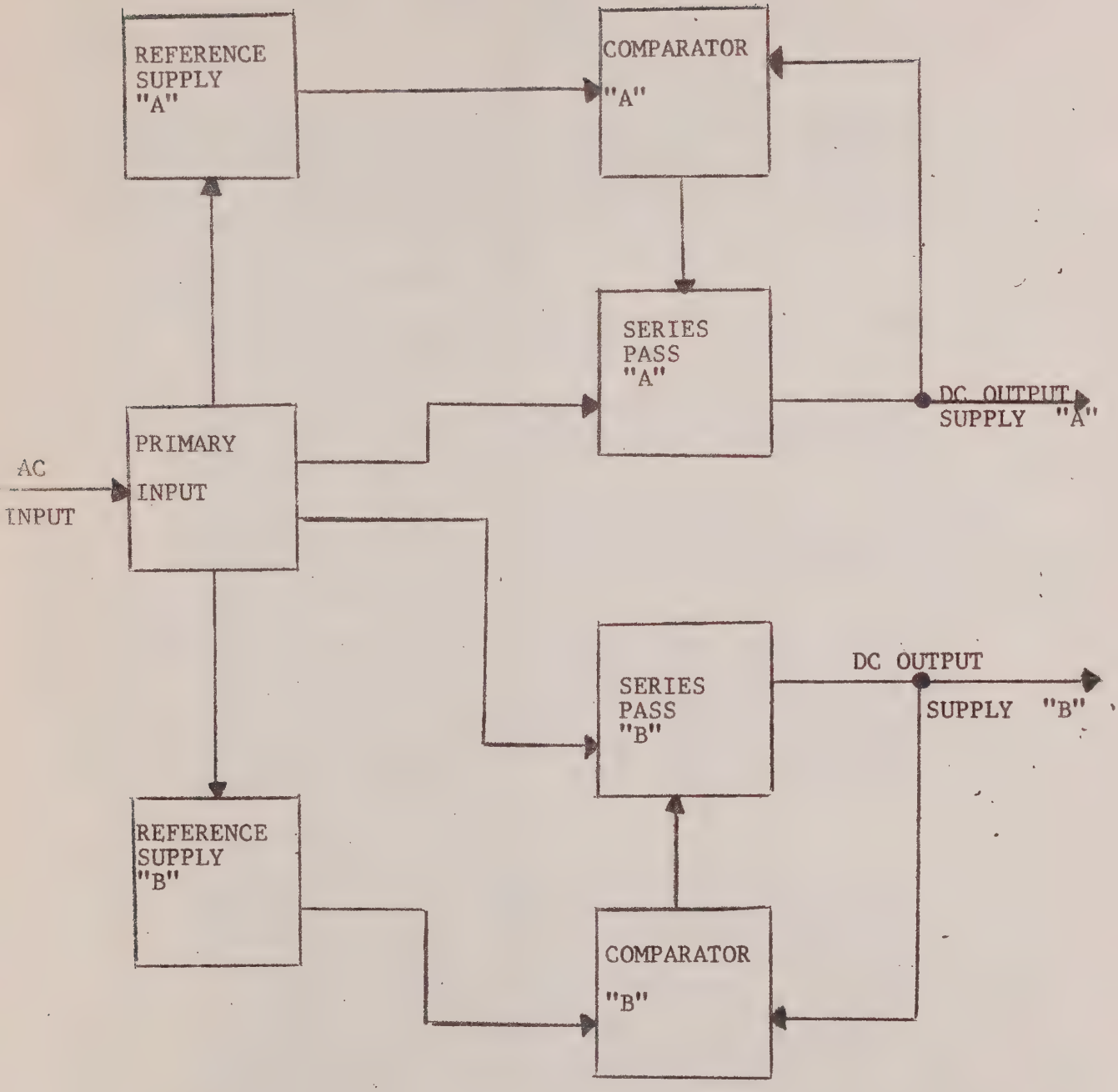


FIGURE 3-1 BLOCK DIAGRAM

SECTION 4
MAINTENANCE

4.1 GENERAL

This power supply is a precision instrument. It is strongly recommended that only experienced troubleshooting personnel perform troubleshooting operations or attempt to repair the unit. If the power supply appears to be malfunctioning at all, the following procedure is recommended for isolating possible defects.

4.2 LOADS AND INTERCONNECTIONS

1. Disconnect all interconnections and loads to which the unit is normally connected.

2. Place shorting links between all appropriate rear panel barrier strip terminals. These connections must be securely made, or deteriouration of output regulation will occur.

3. Connect a resistive dummy load across output terminals. This load should be of sufficient value to allow the unit to operate at its maximum rated current and voltage output.

4. Apply nominal AC input power to the unit and check for normal operation. Satisfactory operation at this time would indicate that any malfunction previously encountered, is external in nature. All interconnections and loads normally used in conjunction with this power supply should then be carefully checked for electrical defects.

4.3 TROUBLESHOOTING

1. Set front panel voltage control and current limit control fully CW. Using a digital voltmeter or oscilloscope, check the voltages across the various circuit components listed on the schematic diagram at the rear of this instruction manual. The sample voltages listed apply only if the unit is operating at its nominal AC input, and has a dummy load of sufficient size connected across its output to allow operation at maximum rated current and voltage output levels. Any reading which is grossly incorrect indicates that the stage being tested or the one immediately preceding it, is defective. The Block Diagram, Schematic Diagram, and appropriate sections of the Theory of Operation will prove helpful in any troubleshooting work. Proper polarity to be observed when testing can be easily obtained from the Schematic Diagram.

2. If voltage checks show no noticeable deviations from the prescribed values, disconnect AC power and proceed with point-to-point resistance checks across pots, switches, diodes, resistors, transistors, in that order.

3. When the trouble is of an intermittent nature such as a poor regulation, ripple, etc., the use of an oscilloscope to determine dynamic changes will be necessary. The section on Theory of Operation should be consulted to determine circuit performance with varying output conditions.

SECTION 5
CALIBRATION

5.1 GENERAL

The following adjustments should be made when necessary to assure optimum operating characteristics and maximum efficiency of the power supply.

5.2 TEST EQUIPMENT REQUIRED (or equivalent)

A) Oscilloscope, Tektronix Type 561

B) Differential Amplifier Plug In, Tektronix Type 63

C) Digital Multimeter, Systron-Donner 7004A

D) Time Base Plug In, Tektronix Type 67

E) AC VTVM, Hewlett Packard Model 400D

F) Variable Auto Transformer, Powerstat Type 3PN136 (5 Ampere rating)

Shorting Link Application

For test purposes, shorting links should be connected across barrier strip terminals to provide local sensing and local voltage programming. To reduce pickup, shielded wire must be used for all connections between test equipment and the power supply being tested. To prevent ground loops, it is important that only one ground connection be made, as shown in Figure 5-1. Tighten all terminal connections as securely as possible, and set all front panels controls fully CW.

5.3 CALIBRATION PROCEDURE

Voltage Adjust Control

A) Maximum Voltage

Set front panel voltage adjust control fully CW. Adjust Maximum Voltage control R20 to obtain an output voltage in excess of the rated output.

B) Minimum Voltage

Set front panel voltage adjust controls fully CCW. Adjust minimum voltage control R24 to obtain a negative output voltage of 0.1 VDC.

C) Adjustment Control

Connect an external test ammeter of appropriate current handling capacity in series with a suitable load.

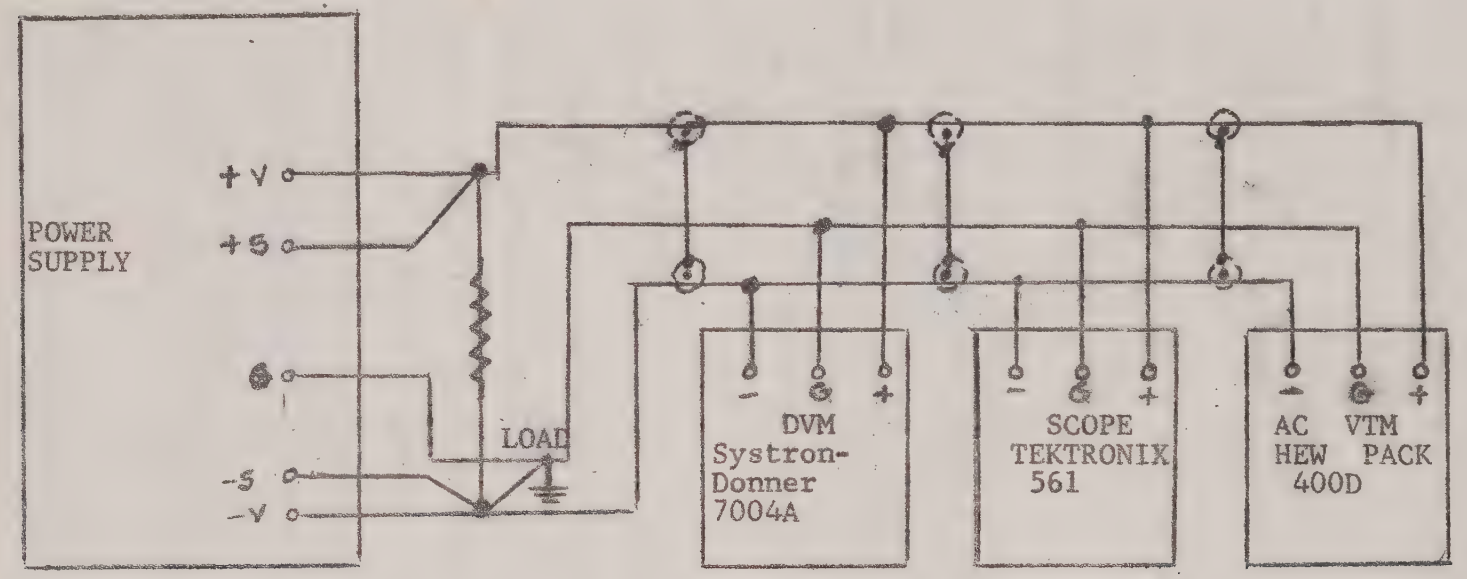


FIGURE 5-1

CONSTANT VOLTAGE OPERATION

Set front panel Meter Select switch S3 to its current monitoring position. Operate the unit at its rated output as indicated on the external test ammeter, and adjust Ammeter Adjustment control R39 until front panel meter M1 indicates a reading of the same value as that indicated by the external test ammeter.

Constant Voltage Operation

A) Load Regulation

With the equipment connected as shown in Fig. 5-1, connect a suitable load resistance across the output terminal connections. The load resistance selected must be able to dissipate the rated power of the unit (P = IE) and must be of sufficient value to yield the rated output current when the rated voltage is applied. Note the voltage indicated on the DVM. Disconnect the resistive load from the output. The maximum change in output DC voltage indicated on the DVM should not exceed by more than 0.01% or 3mv (whichever is greater) that of the output voltage indicated with the load resistance applied.

B) Line Regulation

Place the resistive load across the output and note the voltage indicated on the DVM. Vary the AC input power 10% above above and below the nominal AC input level. The maximum change in output voltage should not exceed by more than 0.01% or 2mv (Whichever is greater) that of the output voltage measured at either extreme of the AC input.

C) Ripple Voltage

In order to reduce pickup, shielded test leads should be used in making ripple measurements. With the resistive load connected across the output terminals, measure the AC ripple with the AC VTVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum ripple amplitude should not exceed 250uv RMS.

Current Limiting

With the equipment turned off, connect a variable resistive load across output terminals. Set front panel meter switch S3 to its voltage (V) position. Set the variable load resistor to its maximum resistance setting, and then slowly decrease the resistance until a decrease in the voltage indication on front panel meter M1 occurs. Observe that as

the resistance value continues to decrease, the indicated output voltage also decreases. Set front panel meter switch S3 to its current (I) position, and note the current indication. Current limiting is effective at the indicated levels.

Similar procedure should be followed for Output A section.

MANUFACTURER'S CODE LISTING - ELECTRICAL PARTS

1) The numbers designated in the SPARES column of the following ELECTRICAL PARTS LISTING indicate the recommended spare parts requirement for support of this equipment for a period of one year.

2) The code designations listed in the MFR column of the ELECTRICAL PARTS LISTING have been assigned to the following manufacturers:

CODE	MANUFACTURER
A-B	ALLEN BRADLEY
ARN	ARNOLD
BUSS	BUSS
CARL	CARLING
CD	CORNELL DUBILIER
CLAR	CLAROSTAT
CORN	CORNISH
CTS	CHICAGO TELEPHONE SUPPLY
ERIE	ERIE
GE	GENERAL ELECTRIC
GI	GENERAL INSTRUMENTS
HOYT	HOYT
IREC	INTERNATIONAL RECTIFIER CORP.
IRES	INTERNATIONAL RESISTOR CORP.
OHM	OHMITE
SCHW	SCHWEBER

CODE	MANUFACTURER
LEE	LEECRAFT
MILW	MILWAUKEE
MOTO	MOTOROLA
PHAO	PHAOSTRON
RCA	RADIO CORPORATION OF AMERICA
ROT	ROTRON
SAGE	SAGE
SANG	SANGAMO
SPRA	SPRAGUE
STEV	STEVENS
TRAN	TRANSITRON
TRY	TRYGON
UNI	UNITRODE
WILG	WILGREEN
WL	WARD LEONARD
SEMC	SEMCOR

Semi-conductors commonly used in Trygon power supplies are available for replacement of spare parts use under the following Trygon, commercial manufacturer or JEDEC part number

RECTIFIERS

SEMI-CONDUCTOR PART NUMBERS

TRYGON STOCK NO.	TRYGON or MFR P/N	JEDEC EQUIVALENT
720427	See 720136	
720440	TR4148	1N4148
720443		1N3208
720450	See 720456	1N3659
720453	See 720456	1N4719
720454	MR1031A	1N4720
720455	MR1032A	1N4721
720456	MR1034A	1N4722
720458	See 720456	
720459	1N758	1N758
720397	1N2164A	1N2164A
720460	1N961B	1N5240B
720468	1N968	1N5250B
720473	1N821	1N821
720488	60HF60	1N2138
720489	C46E	
725008	C180A	
725019	1N765A	1N5241B
725056	MR1220SL	
725071	1N3515A	1N5236B
725076	1N3616	1N3616
725077		1N3262R
725079	MCR2835-4	
725081	MCR216R-2	
725082	MCR216R-3	
725083	MCR216R-5	
725085	MCR216R-6	
725087	MCR3918-1	2N5168
725138	725138	2N4441
725139	See 725142	
725140	MAC 3-2	
725142	725142	2N4442
725143	Y0525	
725144	40526	
741001	741001	2N4990

Semi-conductors commonly used in Trygon power supplies are available replacement or spare parts use under the following Trygon, commercial manufacturer or JEDEC part number.

TRANSISTORS

SEMI- CONDUCTOR PART NUMBERS

TRYGON STOCK NO.	TRYGON or MFR P/N	JEDEC EQUIVALENT
700000	See 705067	
700001	See 700002	
700002	700002	2N3638A
700010	TR346	2N1556
700020	See 705067	
700030	TR361	2N652
700040	TR375	2N1533
700047	700047	2N4238
700050	700050	2N657A
700070	TR951	2N2527
700080	700080	2N3055
700083	700083	2N3232
700085	700085	2N3442
700115	See 705067	
700120	700120	2N1530
700130	700130	2N1554
700140	700140	2N1560
700160	700160	2N2140
700180	700180	2N2714
700182	700182	2N3566
700191	700191	2N4912
700195	700195	2N3441
700196	700196	2N4912
700197	700197	2N3738
700200	700200	2N2139
700205	700205	2N3440
700400	700400	2N3441
700401	700401	2N3771
700402	700402	2N3772
700410	700410	2N3442
700412	700412	2N3568
700413	700413	2N3644
700415	700415	2N3585
700417	700417	2N4918
700420	700420	2N3584
700429	DTS411	DTS411
700430	DTS413	DTS413
700431	DTS423	DTS423
700502	700502	2N5037
700508	700508	2N5240
705018	705018	2N3416
705067	705067	2N2905A
705068	705068	2N2219A
705069	705069	2N4340
705070	705070	2N3233
705071	705071	2N3447
720145	UJ25	2N2647

EFENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK N
1	CAP 500MF-75V	56289	39D507G075HL4	810223
2	CAP .0033MF-600V	33498	GP332K	800025
3	CAP .0033MF-600V	33498	GP332K	800025
4	CAP .001MF-600V	33498	GP102M	800006
5	CAP .0047MF-600V	33498	GP472M	800050
6	CAP 800MF 50V	56289	39D807G050HL4	810226
8	CAP 1100MF-50V	56289	39D118G050HPH	819945
9	CAP 1.0MF-250V		MKT1813	800304
10	CAP 34MF-15V	90201	TTXE	810057
11	CAP 68MF 6V		T360B686M006AS	821019
12	CAP 850MF-75V	56289	39D	810230
13	CAP 68MF 6V		T360B686M006AS	821019
101	CAP 500MF-75V	56289	39D507G075HL4	810223
102	CAP .0033MF-600V	33498	GP332K	800025
103	CAP .0033MF-600V	33498	GP332K	800025
104	CAP .001MF-600V	33498	GP102M	800006
105	CAP .0047MF-600V	33498	GP472M	800050
106	CAP 800MF 50V	56289	39D807G050HL4	810226
108	CAP 1100MF-50V	56289	39D118G050HPH	819945
109	CAP 1.0MF-250V		MKT1813	800304
110	CAP 34MF-15V	90201	TTXE	810057
111	CAP 68MF 6V		T360B686M006AS	821019

REFERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK
C12	CAP 850MF-75V	56289	390	8102
C13	CAP 68MF 6V		T360B686M006AS	82201
CR 1	DIODE 1N4004	21845	1N4004	7103
CR 2	DIODE 1N4004	21845	1N4004	7103
CR 3	DIODE UZ724	12969	UZ724	72015
CR 4	DIODE UZ715	12969	UZ715	72015
CR 5	DIODE 1N2163A	24444	IN2163A	72020
CR 6	DIODE 1N4004	21845	1N4004	71038
CR 7	DIODE 1N4004	21845	1N4004	71038
CR 8	DIODE 1N4004	21845	1N4004	71038
CR 9	DIODE 1N4004	21845	1N4004	71038
CR 10	DIODE 1N4004	21845	1N4004	71
CR 11	DIODE 1N4004	21845	1N4004	71
CR 12	DIODE 1N4004	21845	1N4004	71
CR 13	DIODE 1N4004	21845	1N4004	7103
CR 14	DIODE 1N751A	81483	1N751A	72018
CR 15	DIODE 1N4004	21845	1N4004	71038
CR 16	DIODE 1N4004	21845	1N4004	71038
CR 17	DIODE 1N4004	21845	1N4004	71038
CR 18	DIODE 1N751A	81483	1N751A	72018
CR 20	DIODE 1N4004	21845	1N4004	71038
CR 21	DIODE 1N4004	21845	1N4004	71038

ELECTRICAL PARTS LIST-- DL40-1A

FERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK
CR102	DIODE 1N4004	21845	1N4004	
CR103	DIODE UZ724	12969	UZ724	
104	DIODE UZ715	12969	UZ715	
R105	DIODE 1N2163A	24444	1N2163A	
R106	DIODE 1N4004	21845	1N4004	
R107	DIODE 1N4004	21845	1N4004	
R108	DIODE 1N4004	21845	1N4004	
R109	DIODE 1N4004	21845	1N4004	
110	DIODE 1N4004	21845	1N4004	
111	DIODE 1N4004	21845	1N4004	
R112	DIODE 1N4004	21845	1N4004	
R113	DIODE 1N4004	21845	1N4004	
R114	DIODE 1N751A	81483	1N751A	
R115	DIODE 1N4004	21845	1N4004	
R116	DIODE 1N4004	21845	1N4004	
R117	DIODE 1N4004	21845	1N4004	
R118	DIODE 1N751A	81483	1N751A	
R120	DIODE 1N4004	21845	1N4004	
101	PILOT LIGHT	91802	2110A	
101	FUSE 2.5A-MDL-125V	71400	MDL	
1	METER 40V-1A	83511	KM66	
1R1	METER 40V-1A	83611	KM66	

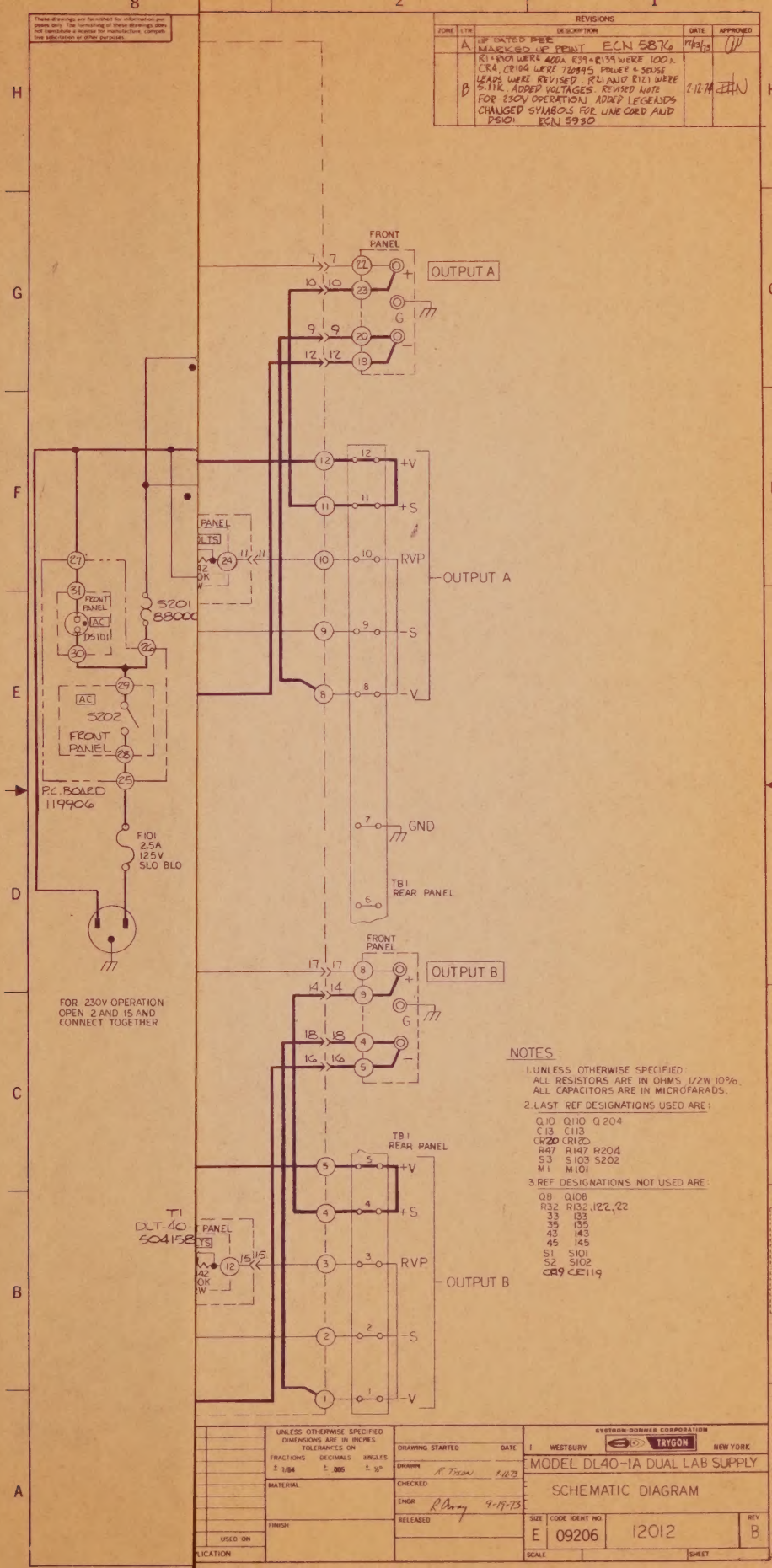
REFDES	COMPONENT	MFR	MFR PART NUMBER	STOCK
1	PLUG P1	06776	WJC24GS24S	83585
1	TRANS 2N2714	03508	2N2714	700180
2	TRANS 2N2714	03508	2N2714	700180
3	TRANS 2N2714	03508	2N2714	700180
4	TRANS 2N2714	03508	2N2714	700180
5	TRASN 2N2905A	04713	2N2905	705067
6	TRANS 2N2714	03508	2N2714	700180
7	TRANS 2N2714	03508	2N2714	700180
9	TRASN 2N4238	04713	2N4238	700047
10	TRANS 2N2714	03508	2N2714	700180
101	TRANS 2N2714	03508	2N2714	700180
102	TRANS 2N2714	03508	2N2714	700180
103	TRANS 2N2714	03508	2N2714	700180
104	TRANS 2N2714	03508	2N2714	700180
105	TRASN 2N2905A	04713	2N2905	705067
106	TRANS 2N2714	03508	2N2714	700180
107	TRANS 2N2714	03508	2N2714	700180
109	TRASN 2N4238	04713	2N4238	700047
110	TRANS 2N2714	03508	2N2714	700180
201	TRASN 2N3233 & SPEC	21845	DRWG	705070
202	TRASN 2N3233 & SPEC	21845	DRWG	705070
13	TRASN 2N3233 & SPEC	21845	DRWG	705070

ERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK
204	TRASN 2N3233 & SPEC	21845	DRWG	70
1	RWWL 250-5W 5%	24681	VAL5	64040
3	RMF 402-.5W-1%	12126	M1/2TI	620
4	RMF 9.76K-.5W-1%	12126	M1/2TI	6205
5	RMF 9.76K-.5W-1%	12126	M1/2TI	6205
6	RCOMP 680-.5W-10%	01121	RC20	61016
7	RMF 2.49K-.5W-1%	12126	M1/2TI	6204
8	RMF 6.81K-.5W-1%	12126	M1/2TI	6205
9	RMF 475-.5W-1%	12126	M1/2TI	6201
10	RMF 6.19K-.5W-1%	12126	M1/2TI	6205
11	RCOMP 1K-.5W-10%	01121	RC20	6101
12	RCOMP 105-.5W-10%	01121	RC20	6102
13	RMF 75K-.5W-1%	12126	M1/2TI	6207
14	RMF 12.7K-.5W-1%	12126	M1/2TI	6206
15	RMF 6.34K-.5W-1%	12126	M1/2TI	6205
16	RMF 6.65K-.5W-1%	12126	M1/2TI	6205
17	RMF 6.65K-.5W-1%	12126	M1/2TI	6205
18	RCOMP 220-.5W-10%	01121	RC20	6101
19	RMF 2.55K-.5W-1%	12126	M1/2TI	6204
20	POT 1K-.5W	32997	3389P1102	6001
20	RMF 1.5K-.5W-1%	12126	M5TI	6203
21	RMF 1.5K-.5W-1%	12126	M5TI	6203

REFERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK
R 21	RMF 2.49K-.5W-1%	12126	M1/2TI	62045
R 23	RLTC 500-3W-3%	00213	1300S	63034
R 24	POT 1K-.5W	32997	3389P1102	60015
R 25	RWWL 4K-5W-5%	24681	VAL5	64054
R 26	RLTC 1K-3W-3%	00213	1300S	63039
R 27	RCOMP 1K-.5W-10%	01121	RC20	61018
R 28	RCOMP 1K-.5W-10%	01121	RC20	61018
R 29	RCOMP 1K-.5W-10%	01121	RC20	61018
R 30	RCOMP 3.3K-.5W 10%	01121	RC20	61023
R 31	RWWL 2.5K-10W-5%	24681	VAL10	64054
R 34	POT 100-2W-10%	12897	DRW6	60004
R 36	RLTC 1.0-3W-3%	00213	1300S	63003
R 37	RMF 2.49K-.5W-1%	12126	M1/2TI	62045
R 38	RWW 560-2W-10%	84411	RWH	64048
R 39	POT 200-.5W	32997	3389P1201	60011
R 41	RMF 39.95K-.5W-1%	12126	M1/2TI	62070
R 42	POT 20K-10TURN	32997	3540S1203	60037
R 44	RCOMP 680-.5W-10%	01121	RC20	61016
R 46	RMF 340-.5W-1%	12126	M1/2TI	62013
R 47	POT 200-.5W	32997	3389P1201	60011
R 101	RWWL 250-5W 5%	24681	VAL5	64040
R 103	RMF 402-.5W-1%	12126	M1/2TI	62014

EFERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK
R 104	RMF 9.76K-.5W-1%	12126	M1/2TI	62059
R 105	RMF 9.76K-.5W-1%	12126	M1/2TI	620599
R 106	RCOMP 680-.5W-10%	01121	RC20	610160
R 107	RMF 2.49K-.5W-1%	12126	M1/2TI	620450
R 108	RMF 6.81K-.5W-1%	12126	M1/2TI	620596
R 109	RMF 475-.5W-1%	12126	M1/2TI	620166
R 110	RMF 6.19K-.5W-1%	12126	M1/2TI	620592
111	RCOMP 1K-.5W-10%	01121	RC20	610180
112	RCOMP 105-.5W-10%	01121	RC20	610290
113	RMF 75K-.5W-1%	12126	M1/2TI	620754
114	RMF 12.7K-.5W-1%	12126	M1/2TI	620621
115	RMF 6.34K-.5W-1%	12125	M1/2TI	620591
116	RMF 6.65K-.5W-1%	12126	M1/2TI	620593
117	RMF 6.65K-.5W-1%	12126	M1/2TI	620593
118	RCOMP 220-.5W-10%	01121	RC20	610100
119	RMF 2.55K-.5W-1%	12126	M1/2TI	620462
120	POT 1K-.5W	32997	3389P1102	600158
121	RMF 2.49K-.5W-1%	12126	M1/2TI	620450
123	RLTC 500-3W-3%	00213	1300S	630340
124	POT 1K-.5W	32997	3389P1102	600156
125	RWWL 4K-5W-5%	24681	VAL5	640549
126	RLTC 1K-3W-3%	00213	1300S	630390

EFERENCE	COMPONENT	MFR	MFR PART NUMBER	STOCK N
R 127	RCOMP 1K-.5W-10%	01121	RC20	610180
R 128	RCOMP 1K-.5W-10%	01121	RC20	610180
R 129	RCOMP 1K-.5W-10%	01121	RC20	610180
R 130	RCOMP 3.3K-.5W 10%	01121	RC20	610230
R 131	RWWL 2.5K-10W-5%	24681	VALIO	640543
R 134	POT 100-2W-10%	12897	DRWG	600044
R 136	RLTC 1.0-3W-3%	00213	1300S	630030
R 136	RWW 560-2W-10%	84411	RWH	640480
R 137	RMF 2.49K-.5W-1%	12126	M1/2TI	620450
R 139	POT 200-.5W	32997	3389P1201	600119
R 141	RMF 39.95K-.5W-1%	12126	M1/2TI	620700
R 142	POT 20K-10TURN	32997	3540S1203	600379
R 144	RCOMP 680-.5W-10%	01121	RC20	610160
R 146	RMF 340-.5W-1%	12126	M1/2TI	620138
R 147	POT 200-.5W	32997	3389P1201	600119
R 201	RLTC 1.0-3W-3%	00213	1300S	630038
R 202	RLTC 1.0-3W-3%	00213	1300S	630038
R 203	RCOMP 220-.5-10%	01121	RC20	610100
R 204	RCOMP 220-.5-10%	01121	RC20	610100
S 3	SWITCH SLIDE		SW422PIWKK740	880610
S 103	SWITCH SLIDE		SW422PIWKK740	880610
S 201	THERMAL SWITCH	14604	DRWG6389-6	880000
S 202	switch ON-OFF	73559	DRWG403950	880010
T 101	XFORMER	09206	DRWG	504152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REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVED
A | LIF DATED PER MARKED UP PRINT ECN 5876 | 12/3/73
B | R1+R101 WERE 400Ω R39-R139 WERE 100Ω CR4, CR104 WERE 750995 POWER + SOURCE LEADS WERE REVISED. R121 AND R121 WERE 3.11K. ADDED VOLTAGES. REVISED NOTE FOR 230V OPERATION. ADDED LEGENDS CHANGED SYMBOLS FOR LINE CORD AND DS101 ECN 5930 | 2.12.74 | EHN
FRONT PANEL
OUTPUT A
+V
+S
RVP
-S
-V
OUTPUT A
S201
88000
DS101
AC
S202
FRONT PANEL
P.C. BOARD 119906
F101 2.5A 125V SLO BLO
GND
TB1 REAR PANEL
FOR 230V OPERATION OPEN 2 AND 15 AND CONNECT TOGETHER
FRONT PANEL
OUTPUT B
TB1 REAR PANEL
+V
+S
RVP
-S
-V
OUTPUT B
T1 DLT 40 504158
NOTES:
1. UNLESS OTHERWISE SPECIFIED: ALL RESISTORS ARE IN OHMS 1/2W 10%. ALL CAPACITORS ARE IN MICROFARADS.
2. LAST REF DESIGNATIONS USED ARE:
Q10 Q110 Q204
C13 C113
CR20 CR120
R47 R147 R204
S3 S103 S202
M1 M101
3. REF DESIGNATIONS NOT USED ARE:
Q8 Q108
R32 R132, 122, 22
33 133
35 135
43 143
45 145
S1 S101
S2 S102
CR9 CR119
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ± ½°
MATERIAL
FINISH
DRAWING STARTED DATE
DRAWN R. Tyson 9-4-73
CHECKED
ENGR R. Darcy 9-19-73
RELEASED
SYSTRON-DONNER CORPORATION
TRYGON
WESTBURY NEW YORK
MODEL DL40-1A DUAL LAB SUPPLY
SCHEMATIC DIAGRAM
SIZE E
CODE IDENT NO. 09206
12012
REV B
SCALE
SHEET

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